

Analysis of Needs for the Application of Differentiated Learning in Class X Natural and Social Sciences Subjects at SMKN 1 Bengkulu City

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Abstract

The research aims to find out how the implementation of learning is differentiated in class X natural and social sciences at SMKN 1 Bengkulu City even semester of the 2022-2023 academic year. In this study, a qualitative approach is combined with a descriptive way of analysis. The study's findings are displayed in the form of exposure. The data collection methods used in this study were observation, interviewing, and documentation. There were 5 participants in the study at SMKN 1 Bengkulu City. This study's main objective is to describe how differentiated learning can be implemented in the solar system's natural and social sciences chapter. In the first phase, learning readiness, interests, and learning profiles are used to map students' learning needs. The second phase is to plan, which entails developing a differentiated learning strategy employing three types of differentiation: content, process, and product. The third phase involves implementing differentiated learning in accordance with the created learning implementation plan, and the fourth phase involves evaluation and reflection with the goal of being able to perceive the drawbacks and benefits as material for the next learning improvement. Researchers are interested in the effects of differentiated learning implementation on classroom learning activities once it has been put into place. From the results of the interviews, it was concluded that 85% of the science teachers at SMKN 1 Bengkulu City agreed, the school management team 100% agreed, and 98% of students agreed to apply differentiated learning to the science subject in class X SMKN 1 Bengkulu City.

A. Introduction

Each student requires learning that suits their needs, so the teacher must be able to understand the special needs and characteristics of each student in the class. This information is useful for teachers to decide on the best learning process design for their students. Knowing the diverse needs and characteristics of learners will help teachers to create different learning opportunities for them. In the classroom, learning that takes into account student differences is still comparatively uncommon. Teachers still prefer to carry out lessons in a uniform manner, despite the fact that they frequently deal with students who have different cognitive, psychomotor, and attitude characteristics. Although instructors must explore for learning models that can assist them fulfill the requirements of their students, this does not obligate them to provide pupils with a variety of learning opportunities. Education cannot be uniform, you must respect the differences that exist in children, it is not good to uniform things that are not deemed necessary. According to Ki Hajar

Dewantara, the aim of education is "to guide children with all their strengths and existing nature to achieve safety and happiness as human beings and members of society." The main philosophy of Ki Hajar Dewantara prioritizes student-centered education. The roles and values that must be possessed by a teacher are partiality to students (Marisyah et al., 2019; Mudana, 2019; Susilo, 2018). Differentiated Learning refers to any attempts made to adapt the learning process in the classroom to match the needs of the pupils. A learning environment that encourages students to learn, effective classroom management, consistent assessment, and rational decisions made by the teacher to meet the needs of students in accordance with learning objectives are all components of differentiated learning. Tomlinson (2001) in his book "How to Differentiate Teaching in Mixed Ability Classrooms" classifies the needs of students into three aspects: 1) Readiness to learn, namely the readiness of students to receive information about the availability of knowledge and mastery of students' skills according to new knowledge and skills to be taught. This information is used to map the needs of students, with the aim of establishing the level of difficulty of the material presented. 2) Interest is a state of mind that produces a purposeful response to a particular situation or object that is pleasant and satisfying. Enthusiasm is an encouragement in students to participate actively in learning. 3) learning profile refers to how students learn. By mapping the 3 learning needs based on learning profiles, students have the opportunity to learn naturally and effectively.

There are 3 strategies in implementing differentiated learning, namely 1) Content differentiation refers to what material is taught to students by mapping the learning needs of students and using groupings based on students' readiness, abilities, and interests. Learning materials can be designed with different learning activities, one of which is the integration of learning materials. This activity can be carried out in several steps, namely a) determine the learning objectives b) determine how to evaluate the learning objectives c) evaluate students to determine the level of mastery of the subject matter d) reduce the time for students who have mastered the material e) give lessons to a group small who have not mastered the material. 2) Process differentiation refers to how students interpret or understand information or material through tiered activities (students work to build the same understanding but with different supports, challenges and complexities), asking guiding questions through focal points, creating individual agendas to learners, facilitating the time needed to complete assignments, carrying out activities that accommodate visual, auditory, and kinesthetic learning styles. 3) Product differentiation reflects students' understanding of the expected learning objectives through work or performance presented to teachers in the form of essays, articles, presentations, audio transcripts, videos, diagrams, and others. Differentiated learning, according to Kusuma and Lutfah, is the result of a number of sensible choices made by teachers who are focused on the needs of their students. The choices are made in relation to: 1. A curriculum with distinct learning objectives, 2. How the instructor addresses or addresses the educational demands of his students, 3. How the instructor fosters an atmosphere that "invite[s]" students to learn and put up a lot of effort in order to accomplish ambitious learning objectives, 4. Successful classroom management; 5. Ongoing evaluation.

The aim of PIPAS education in schools is to equip students to be able to solve real-life problems in the 21st century that are related to natural and social phenomena around them scientifically by applying scientific concepts. Or in other words, after studying the subjects of the Natural and Social Sciences Project, students can acquire the skills to make the right decisions scientifically so they can live more comfortably, healthier and better. There are still many obstacles that have been faced in the PIPAS learning process at SMKN 1 Bengkulu City. For example in Earth and Space material, where the media to understand this material cannot be done by direct observation, but requires media and learning resources, it was found that not all students liked reading material through encyclopedia books, some liked watching videos, some liked by reading science comics, etc., in various ways the teacher seeks solutions so that all students can participate actively in learning. The previous research that was used as a literature review was "The Effect of Differentiated Learning Strategies on Learning Outcomes of Lahusa 1 Public High School Students" (Laia et al., 2022) and "Implementation of Differentiated Learning in Efforts to Increase Activities and Mathematics Learning Outcomes of Class XI Students Mipa SMA Negeri 8 Barabai" (Kamal, 2021). Based on the description above, the researcher is interested in getting a further description of differentiated learning and it is hoped that it will be useful for teachers in other schools by conducting research entitled "A needs analysis of the application of differentiated learning in the subjects of Natural and Social Sciences in Class X SMKN 1 Bengkulu City. Based on the background above, the researcher can identify the problem of how the teacher's level of need for the application of differentiated learning in the classroom.

B. Research Methods

The research method used in this research is descriptive analytical method with a qualitative approach. Qualitative descriptive data analysis techniques are one of the techniques or methods used in qualitative

research (Yuliani, 2020). Qualitative research is research that places more emphasis on observing phenomena and requires sharp instincts from researchers (Andika, 2023; Puspita & Suryani, 2022). Qualitative research usually positions humans as research tools by conducting inductive data analysis and is more concerned with process than research results (Kevinia et al., 2022; Nurhayati et al., 2023). The informant is the presence of someone who is asked for information regarding the object under study (Ansori & Putri, 2021; Azizi & Rachmadi, 2020). Informants have a lot of information related to data from the meaning of the research being carried out, because of that the mention of informants is more closely related to informants who usually exist in research where the research subject is in the form of "cases" of one unit, including those in the form of institutions or organizations or social institutions. In this study, the informants were 3 teachers who taught science subjects, the school management team consisted of 2 people, namely the principal and representatives of the curriculum sector, and 10 students.

With this approach, the researcher examines the phenomenon's significance in addition to describing the events that have taken place. Activity analysis and content or document analysis are two categories of analysis used in descriptive research. An examination called a "activity analysis" seeks to examine the actions taken as tasks are being completed. Analysis that focuses on gathering and analyzing official documents, including statutory and policy papers as well as research findings is known as content analysis or document analysis. To get the best findings, researchers must use effective data collection methods. Data collection techniques are the most important step in research, because the main objective of research is to obtain valid data. Qualitative data collection techniques namely by studying documents, interviews, discussions, and observations. This is what researchers do in order to obtain valid data to analyze the application of differentiated learning.

The phases of the research, as well as the research management structure, must be carefully planned for qualitative research designs. These parts of the research process assist researchers in gathering as much data as they can and in precisely and methodically describing the data related to the research they are conducting. During this phase, the researcher conducted the initial observations regarding differentiation in scientific lessons, spoke with students after learning, and took pictures throughout the class. Research instruments are equipment used or required for data collection. Written instructions and observations were analyzed through observation, interviews, and documentation as research instruments. In qualitative research, there are 6 (six) different sorts of instruments: interview guides, questionnaires, writing tools, recording equipment, and papers. Six different instruments were employed by the researchers in this investigation.

Data analysis is organizing data, presenting data, and drawing conclusions. The location of this differentiated learning implementation research coincides with SMKN 1 Bengkulu City which is located at Jalan Jati No. 41 Bengkulu City. The researcher chose this location because the researcher is one of the teachers from the school, making it easier for the research process to take place.

C. Results and Discussion

The steps that must be taken in analyzing the needs for the application of differentiated learning include conducting interviews with science subject teachers at SMKN 1 Bengkulu City. From the results of interviews with 3 teachers, it was found that in the application of learning so far, teachers still generally generalize their treatment of students. They do not carry out an assessment before starting learning so they do not know and recognize the characteristics of students such as their learning readiness, interests and learning profile. From this ignorance, the teacher finally gave the same treatment to students both when providing material content, the stages of handling during the learning process were not distinguished by treatment for students who had achieved a very good, moderate understanding, with those who still needed guidance. Likewise with the product content of a given project, the teacher has not provided many opportunities for students to freely channel their interests and talents to choose the appropriate product. Of the three teachers, all agreed to apply differentiated learning in science subjects. They are interested in making changes to their way of teaching so that they can provide stages in the learning process according to the needs of students. From the interviews it was also found that teachers still needed educational guidance regarding the stages in implementing differentiation learning which so far they were not familiar with or familiar with. Guidance is very much needed from preparing diagnostic assessments, preparing learning designs, content or teaching materials, stages of handling the learning process, and determining content or projects. Of the 3 teachers, it was found that 85% of the teachers agreed that differentiated learning was applied to science subjects so that students get learning that suits their needs.

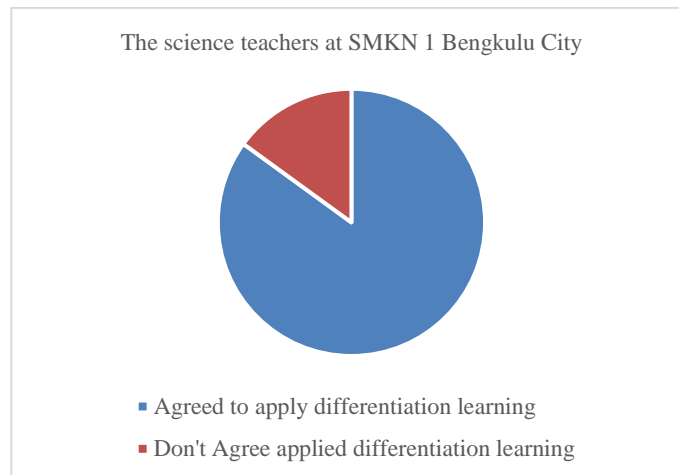


Figure 1. Comparison of Teachers Who Agree and Disagree to Apply Differentiated Learning

Education that is student-centered according to [Suwartiningsih \(2021\)](#) places more emphasis on aspects of the process of how students learn and the effects of the learning process on the development of the students themselves, especially in science learning. Science learning involves student activity, both physical activity and mental activity and focuses on students, which is based on daily experiences. Natural Science Education (IPA) emphasizes direct experience to find out and do things so that they are able to explore and understand nature in a scientific way. During learning students will have meaningful learning experiences so that at this stage students are able to develop values from learning science. This is in line with differentiated learning which accommodates student-centered education.

The researcher also interviewed the school management, especially the Waka Curriculum and the Principal. After they understand the goals and demands and content that exist in differentiated learning, they are very amenable to implementing it in schools. Moreover, the school has implemented this independent curriculum for 2 years and is a school that has received the Center of Excellence Vocational High School program for 2 years and is now continuing to receive the advanced SMK PK. The SMK PK is one of the priority programs of the Directorate General of Vocational Education of the Ministry of Education and Culture in 2021, according to Wikan Sakarinto (Sutrisno: 2021), the Director General of Vocational Education of the Ministry of Education and Culture. In an effort to improve quality and performance, this program was developed to create SMKs with specific specialization. Naturally, collaborations with business and industry (DUDI), as well as the participation of local and regional government and vocational colleges as allies, must exist in order to deepen this accomplishment.

In addition, through the PK PK program it is also hoped that it can become a reference school and a center for improving the quality and performance of schools in the vicinity so that it is more relevant to the needs of the world of work and industry. PK SMK is included in one of the superior programs. This will be the 8th 'Freedom to Learn'. The preparation process is also very detailed because it involves 1.5 million SMK graduates in Indonesia, both working, continuing to tertiary education and entrepreneurs, all of whom must 'link and match' with the world of business and industry. With this mandate, SMKN 1 Bengkulu City is required to maximally apply the independent curriculum and one of them is to provide learning services that are pro-students, according to the needs of students by carrying out differentiated learning.

Tomlinson, "Assessment is ongoing and diagnostic. By thoughtfully using assessment data, the teacher can modify content, process, or product." Continuous assessment and starting with a diagnostic assessment of students will be very helpful for us as teachers to be able to carry out differentiated learning. It will be easy for teachers to carry out differentiated learning, be it content, process or product differentiation. Starting with a diagnostic assessment, it will be the teacher's initial capital to find out the interests and talents of students, their learning profiles and their learning readiness.

The application of differentiated learning is also supported by the resources or strengths owned by the school. Based on observations at SMKN 1 Bengkulu City, it was found that to support content differentiation learning, the facilities owned by the school include a complete library that already uses a computerized system and collaborates with PUSNAS Jakarta. According to [Abdullah \(2017\)](#), learning media or those that can have an impact on the development of each individual in their environment must receive serious attention from parents, educators and policy makers (government) so that the environment.

Therefore, SMKN 1 Bengkulu City, which incidentally is a SMK engaged in the field of multimedia or visual communication design, where this department already has a complete laboratory makes it easier for teachers to make videos or learning content that can be used so as to enrich material content and content differentiation learning can also be implemented. In addition, parents who support the school program are extraordinary support for the implementation of this differentiated learning.

As for the application of process differentiation learning, even this is very possible to apply. Because teachers at SMKN 1 Bengkulu City have good skills in managing the learning process, this is supported by the existence of a school program that always conducts in-house training every year to upgrade teachers' understanding of strategies in learning. In addition to participating in in-house training, teachers are always encouraged to improve their competence by participating in self-development programs such as upskilling and teacher apprenticeships which are very helpful in refreshing teacher competencies according to the demands of the business world and industry.

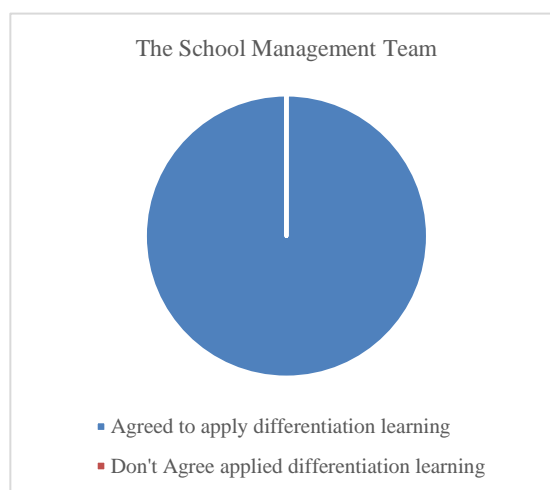


Figure 2. Comparison of the School Management Team who Agree and Disagree to Apply Differentiated learning

Likewise, for the application of product differentiation learning, from the results of observations, the researchers observed that teachers at SMKN 1 Bengkulu City were very likely to implement it. This is supported by the structure of the SMK curriculum which indeed demands to be project-based which produces products as well as input from students at SMKN 1 Bengkulu City who have diverse characteristics, both interests, talents, cultural background, religion, economic level, learning profile, learning readiness, and others. From the results of the diagnostic assessment given at the beginning of the school year to all students, data on the characteristics of all these students can be drawn. This assessment is carried out by the counseling teacher whose analysis results are submitted to each subject teacher. From these results, the teacher will know the characteristics of students such as learning styles, learning profiles, interests, talents of students in learning. By knowing this, the teacher will find it easy to design a form of product differentiation offered to students. And students will get impartial learning based on the needs of students. And it is hoped that later students will be able to increase their potential so that they become quality human beings. This is in line with the function of understanding science itself which is an urgent matter in human life in the world so that humans improve their quality and abilities and elevate their existence.

Based on the results of the questionnaire survey given to 10 students who were samples from 3 classes namely class XTJKT 1, X TJKT 2, and X DKV 3, the result was that 98% of participants agreed to implement differentiated learning. From the first question related to learning needs in favor of students, 100% they agreed to be implemented. For the second question, relating to the application of learning in accordance with their interests and talents as well as their learning readiness, 100% agree. As for the third question related to the form of assignment desired by students, as many as 90% who answered agreed to be given the freedom to choose according to their wishes. And question 4 regarding how the teacher provides assistance in stages, according to the difficulties faced by students, as much as 100% agree. And the last question regarding teachers who provide learning using various media, students answered that they agreed 100%. From the results of this survey, the researchers concluded that 98% of students agreed with the application of differentiated learning in science subjects.

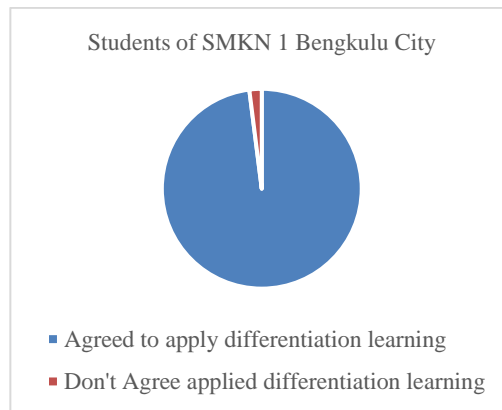


Figure 2. Comparison of the Student of SMKN 1 Bengkulu City Who Agree and Disagree to Apply Differentiated learning

There are several things that need to be considered in implementing an effective differentiated learning process, namely the following:

1. Planning a differentiated class by paying attention to 3 important parts, namely classifying material, diagnosing student readiness, and designing various learning experiences.
2. Organize differentiated classes by developing several examples to manage student assignments
3. Assessment in differentiated classes which are an integrated part of learning
4. The role of teachers and students where the teacher becomes a facilitator while students will become active participants in their own learning process
5. Learning environment with many types of learning activities and a variety of groups.

With differentiated learning methods to increase students' interest and learning readiness. From the students' interest and learning readiness, this will improve students' creative thinking skills (Pane et al., 2022)

By paying attention to the results of observations, interviews, surveys and the five factors above, the researcher concluded that it is necessary to apply differentiated learning in the science subject in class X SMKN 1 Bengkulu City

D. Conclusion

From the results of the interviews, it was concluded that 85% of the science teachers at SMKN 1 Bengkulu City agreed, the school management team 100% agreed, and 98% of students agreed to apply differentiated learning to the science subject in class X SMKN 1 Bengkulu City.

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